The Sensitive Ecosystems Inventory of East Vancouver Island and Gulf Islands: Latest Evaluations of Status

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Abstract
The Sensitive Ecosystems Inventory of East Vancouver Island and Gulf Islands (SEI) identified and mapped rare and fragile ('sensitive') ecosystems using aerial photography and selected field checks. Results of this SEI (1993-1997) showed that only 7.9% of the study area remained in a relatively natural state. Since publication of the maps and data, a variety of outreach tools have been used to promote the SEI. Development pressures continue, so the principal agencies (Canadian Wildlife Service, Ministry of Water, Land and Air Protection and Ministry of Sustainable Resource Management) have been assessing the effectiveness of the SEI products and outreach program in minimizing the rate of ecosystem loss. Three projects will be discussed:

- Audit of Selected Polygons of the SEI of East Vancouver Island and Gulf Islands, 1999-2001
- SEI Outreach Evaluation, 2002
- Field checking of additional polygons, 2002

In addition, satellite imagery is being assessed for accuracy/applicability, and 2002 ortho-photography will be used for a review of all the original polygons. This conference paper will examine the effectiveness of the SEI approach, the implications of vanishing habitats, and the tools that have been the most effective in the protection of sensitive ecosystems.

The Sensitive Ecosystems Inventory
The Sensitive Ecosystems Inventory (SEI) for east Vancouver Island and adjacent Gulf Islands is a joint federal/ provincial initiative between Environment Canada (Canadian Wildlife Service, the British Columbia Ministry of Water, Land and Air Protection (Vancouver Island regional office) and the BC Ministry of Sustainable Resource Management (Conservation Data Centre). This presentation looked at the effectiveness of the SEI approach.

During the early 1990s, the Sensitive Ecosystems Inventory mapped rare and ecologically fragile ecosystems in the coastal lowlands of east Vancouver Island and adjacent Gulf Islands. This area was chosen because many rare ecosystems were being destroyed by intense urban and rural development as well as ongoing resource extraction, primarily logging. The SEI was developed using air photo interpretation, with field checking of about 30% of the identified polygons. Seven 'sensitive' ecosystem types were mapped (Older Forest, Woodland, Wetland, Riparian, Terrestrial Herbaceous, Sparsely Vegetated and Coastal Bluff), together with two 'other important ecosystem' types (Older Second Growth Forest and Seasonally Flooded Agricultural Field). The results of this inventory showed that sensitive ecosystems covered only 7.9% of the study area. The two 'other important ecosystems' accounted for a further 11.6% of the study area.

The SEI maps were produced in 1997 in digital (ArcInfo) and hardcopy (1:20,000) formats and provided to a range of potential users including all local governments and selected senior government agencies in the study area, as well as conservation groups, consultants, the forest industry and others interested in the product. Two technical reports were published to accompany the maps and database, describing the inventory (Ward et al 1998) and providing management recommendations (McPhee et al 2000). Colourful pamphlets and newsletters were widely distributed and used as part of an extensive outreach program that included presentations and workshops, and scientific support from Conservation Data Centre staff.

Having completed the inventory, project staff wanted to find out if the inventory and its outreach had resulted in 'on the ground' protection for these sensitive ecosystems. To examine the results, a preliminary audit was conducted in 1999 to find out how many SEI polygons still existed and how many had been disturbed. Three years later, during the winter of 2002, an evaluation of the effectiveness of the entire SEI program was done by measuring the areas of disturbance to all of the SEI polygons and by interviewing users.

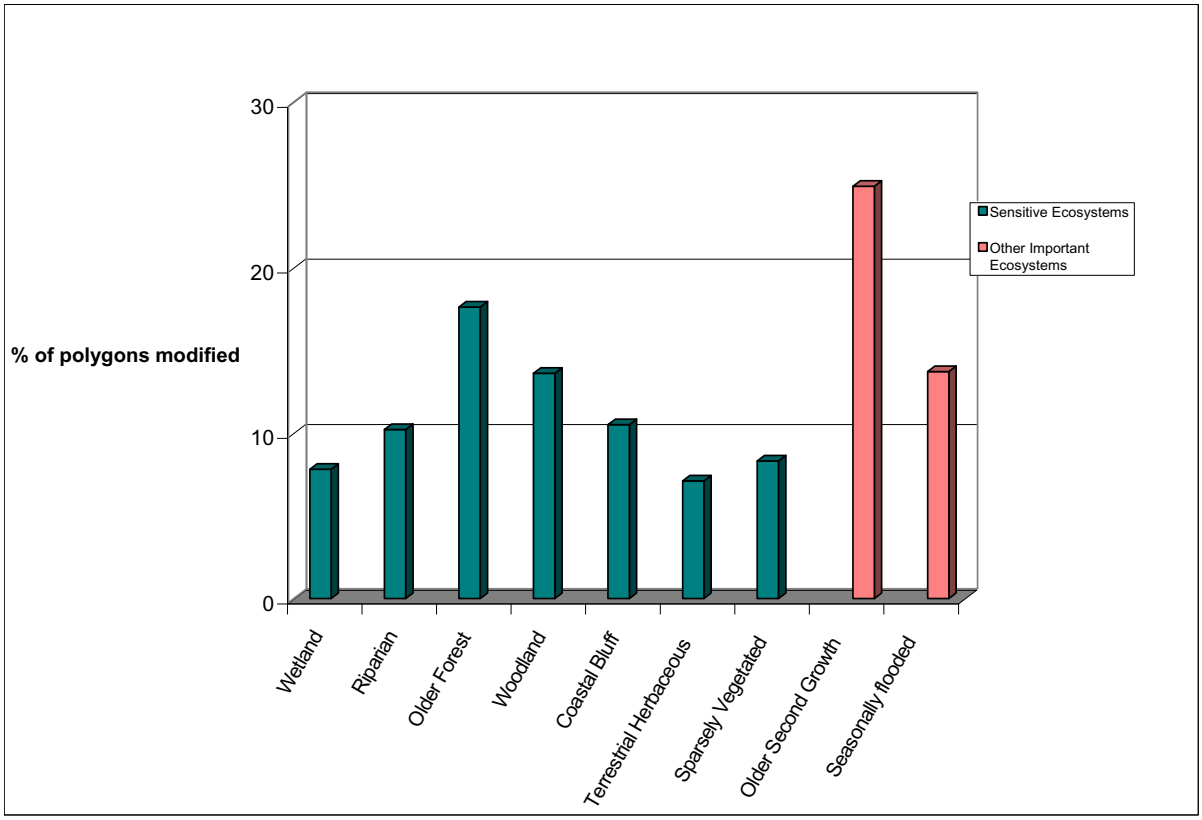

Figure 1. 1999 Audit Results: Modified SEI Polygons by Ecosystem Type.

1999 Audit

The audit was conducted by the Ministry of Water, Land and Air Protection staff using 1999 orthophotos to identify changes to the SEI polygons. Map sheets were selected from throughout the study area, especially where rapid development was known to be occurring. Each SEI polygon on those map sheets was examined and classified as "Undisturbed," "Disturbed" or "Severely disturbed/degraded." About one-quarter of the SEI polygons—2,000 of the 7,388 sites—were examined. The results were then analysed by ecosystem type and by general land use category (Caskey and Henigman 2002).

The results of the audit showed that overall, 11.2%—one in nine—of the SEI polygons had been modified (disturbed or severely disturbed/degraded) since the original SEI mapping 6–8 years before. The greatest level of disturbance was to Older Second Growth Forests (24.9%), primarily from forestry activities. Of the sensitive ecosystems, the greatest impact was to Older Forests (17.6%), resulting both from urban encroachment and from forestry. All ecosystem types have been impacted to some degree (Figure 1).

The analysis of disturbance by land use category (Figure 2) showed that the greatest impacts came from urbanisation: 22.8% of SEI polygons in 'urban' settings (zoned 2 ha and under) showed some degree of disturbance. Even some of the polygons identified as "greenspace" had been impacted to some degree by the development of trails and tourist facilities. For one land use category—the Vancouver Island Highway Project, which was being developed just as the SEI was completed—all SEI polygons assessed had been disturbed or obliterated, including those at the edges of the road right-of-way.

The audit report concluded that if these losses were to continue, all of the remaining natural sensitive ecosystems could be impacted within the next few decades. Because so much of the landscape on the east coast of Vancouver Island has been historically altered, conservation of these remnant natural ecosystems is critically important to maintain native plants, animals and plant communities. These ecosystems provide living space for many organisms that are rare or threatened and which cannot survive in modified environments. Encroachment, whether the development of housing in one corner or a trail through the centre of an ecosystem, reduces the size of the undisturbed portion and may result in the loss of additional species which no longer have the space needed to survive. This will result in a further loss of biodiversity on east Vancouver Island and the Gulf Islands.

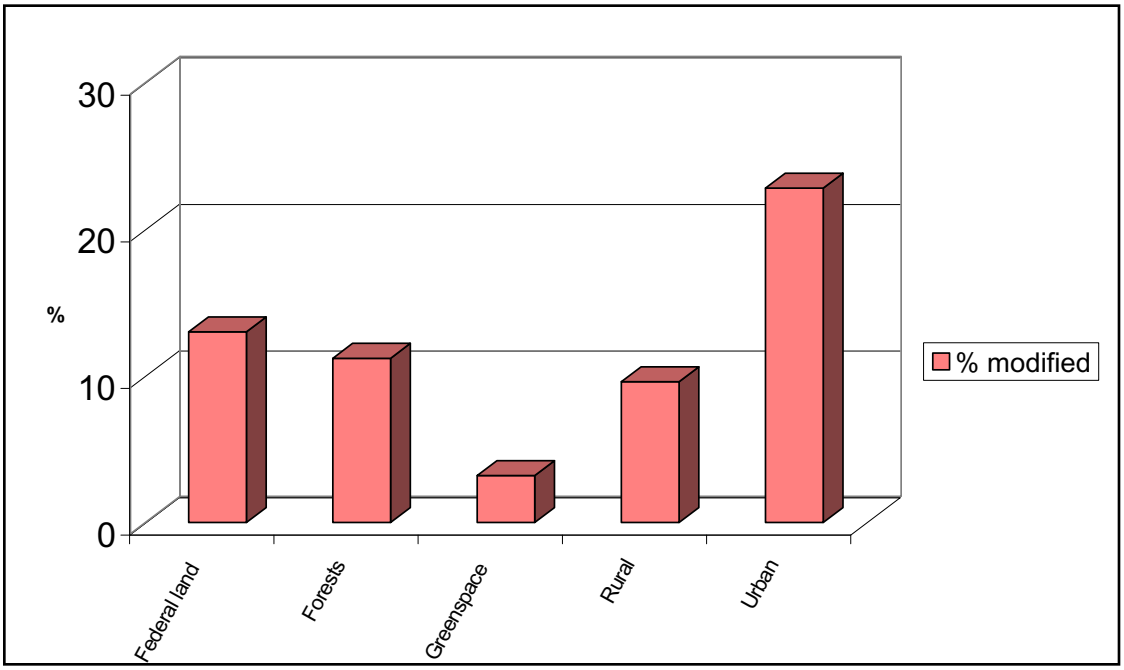

Figure 2. 1999 Audit Results: Modified SEI Polygons by Land Use Category.

2002 Evaluation

During the winter of 2002-03, Environment Canada's Canadian Wildlife Service conducted an evaluation of the entire SEI approach. There were two components to this evaluation. Disturbance mapping was used to measure the actual areas of disturbance to all of the original polygons, and SEI users (and non-users) were interviewed to determine the overall effectiveness of the program.

Disturbance Mapping

Disturbance mapping was used to identify changes to all 7,388 SEI polygons, by overlaying the original SEI polygons on 2002 ortho-photography. Some areas of disturbance were too small to digitise or were dispersed throughout a small polygon (e.g. from logging roads, trails and patchy clearings). In these cases, the polygons were classified according to the level of fragmentation of that polygon (<6%, 6-25%), and small polygons with more than 25% fragmentation were deleted from the SEI database as the ecosystem values were considered to be compromised. Where there were larger areas of visible disturbance (e.g. from logging, urban or rural use, major roads, trails/recreation, agriculture or industrial use), these portions of the polygon were deleted from the database. The remaining intact portions of the altered polygons are being reviewed to determine if they still qualify for inclusion in the SEI.

The final results and analysis of this disturbance mapping will be available by the end of 2003. However, preliminary results showed that over 5,000 ha (6.6% of the original SEI ecosystems) were disturbed between the original mapping (early 1990s) and 2002. This included the disturbance of approximately 1,000 hectares (3%) of 'sensitive' ecosystems. The greatest loss to sensitive ecosystems was to Older Forest ecosystems (5.6%), followed by 3% loss of Riparian ecosystems, 1.5% Wetland loss and 1% Woodland loss. Over 4,000 ha (9%) of the 'other important ecosystems' were disturbed, almost all in the Older Second Growth Forest category.

The 3% loss of sensitive ecosystems documented by disturbance mapping was lower than the disturbance figures from the 1999 audit. This is likely because the audit documented only the existence of disturbance to selected polygons, whereas the actual area of disturbance was measured in 2002. Also, the audit focused on areas that were known to be rapidly urbanising and therefore subject to significant changes. Nonetheless, the disturbance mapping shows ongoing loss of already rare ecosystem types.

Interviews

The second component of the 2002 evaluation involved interviewing existing and potential SEI users in order to answer the question "How effective has the SEI been in influencing conservation-based land use decision making?" Eighty people from three sample groups were interviewed: decision makers (all levels of government and industry); non-government organisations and unaffiliated members of the public; and consultants (Axys 2003).

The evaluation found that, in general, the SEI had reached its target audiences. Local government decision-makers reported a high level of satisfaction with SEI —it had been used by engineers and park managers as well as by planners, and 75% of respondents reported that the SEI had met their needs. The SEI information appeared to be well known and useful: more than half of the decision makers responding to the survey had made six or more requests for scientific support related to SEI. However, although most interviewees were familiar with the SEI maps, many were unfamiliar with the supporting products, such as the website, pamphlets, field data and workshops.

It appeared the SEI was being used for its intended purposes, i.e., strategic-level planning, development permitting and land protection. Many local governments interviewed had incorporated SEI information into official community plans and development permit areas, and reported using SEI information when considering land development. SEI data was also reported as useful for parks and greenspace management. Some respondents felt that a weakness of the SEI was that it did not provide detailed information for site level planning, and this prevented them from using the information. This indicated that users did not fully understand the intended purpose of the SEI and that they would have liked an inventory that provided site-level detail. This was particularly true among decision makers and non-government organisations and may reflect their limited resources for undertaking their own detailed inventories (Axys 2003).

When asked whether the SEI has helped to protect lands from development, over 90% of the decision makers and non-government organisations reported that the SEI had been 'somewhat' or 'highly' effective in influencing their decision to protect a site or to advocate for its protection. Respondents identified more than 240 SEI polygons that had been protected (the total number of polygons protected is likely to be much higher as only a sample of SEI users were interviewed). The main protection mechanisms used to protect SEI sites were park dedication, conservation covenants, management agreements and Development Permit Areas (or other conditions on land development).

The comments from the SEI users reinforced the importance of updating the information regularly, and this is currently being addressed through the disturbance mapping.

Conclusion

Was the SEI effective? At this stage the answer appears to be "yes and no." Although it may not provide all the answers, the SEI has provided valuable scientific information in support of land use decision-making, and has aided in the identification and protection of sensitive ecosystems on east Vancouver Island and Gulf Islands. It has resulted in raising awareness of individual sites, resulting in 'on the ground' protection for many sensitive ecosystems. At the same time, however, both the audit and disturbance mapping show that the loss of sensitive ecosystems continues.

The Sensitive Ecosystems Inventory program provides data and management recommendations, and encourages the use of a variety of conservation tools. However, there is no federal or provincial legislation that **requires** protection for sensitive ecosystems. The high degree of private land ownership in this area means that a multi-faceted approach to ecosystem conservation is required, reaching local governments, private landowners, developers and development consultants. Incentives, such as the federal ecological gifts program, are essential to encourage ecosystem protection on public and private land.

The conclusion of the evaluation was that this inventory and associated outreach products and services were a good start. Landowners and local government decision-makers must understand the need to protect sensitive ecosystems, and there must be policies, legislative tools and incentives to make this happen. Updating of the inventory information is also very important or it can quickly become outdated.

More information can be found on the SEI website: srmwww.gov.bc.ca/cdc/sei

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